



Operating Instructions



Zone 1 Ex i Field Device Coupler 4 Spurs

> 9411/21



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2 General Information

2.1 Manufacturer

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2.2 Operating Instructions Information

ID-No.: 161935 / 941160310010
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 We reserve the right to make technical changes without notice.

2.3 Definitions of terms

Trunk

The trunk is the main bus line when describing fieldbus topology.

Terminating resistor

Both ends of the trunk are connected with a terminating resistor (100 ohms + 1 mF).

Spur

A spur connects the trunk with the field devices. Spurs can be further subdivided into additional branches.

Fieldbus power supply

The fieldbus power supply feeds DC power to field devices on the fieldbus and effects impedance adaptation between the fieldbus and the main power. Electrically, the host behaves the same as a field device.

Field device

Field devices are often supplied from the fieldbus, however, they can also have their own power supply (4-wire device).

Host

The host is the “brain” of the fieldbus. In general the host is a process control system (PCS), a programmable logic controller (PLC) or a PC.

Segment

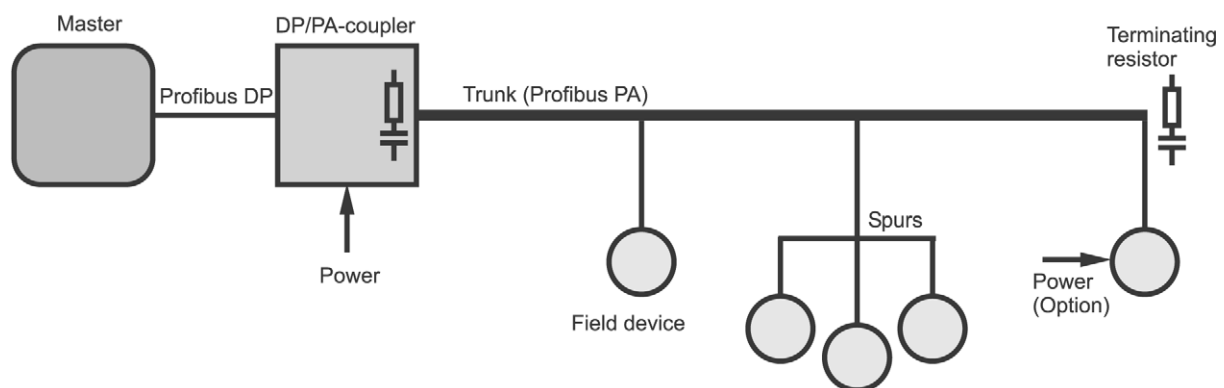
A segment in this context indicates the entire unit consisting of trunk, terminating resistors and all spurs.

DP/PA coupler

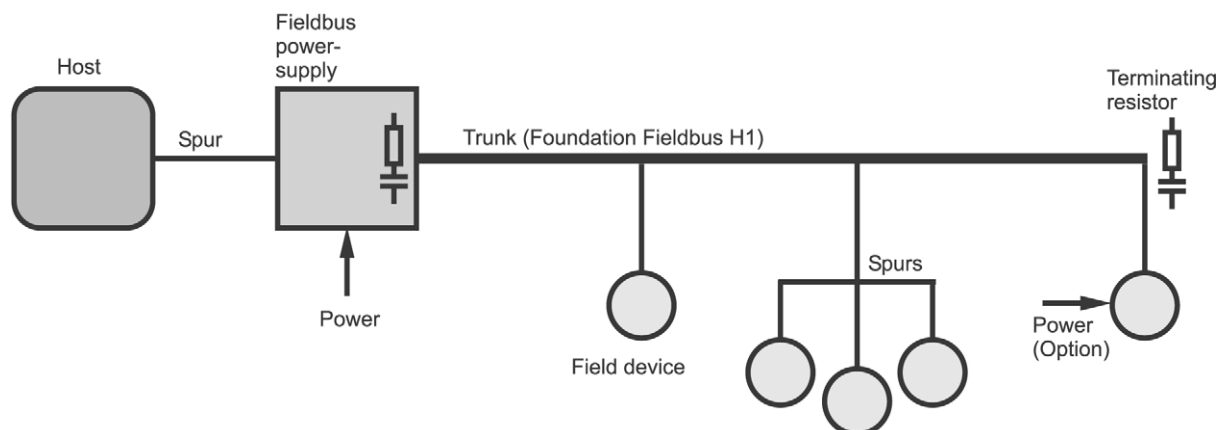
The DP/PA coupler connects a Profibus PA segment with a Profibus DP. The fieldbus power supply is integrated in the DP/PA coupler.

Master

The Profibus master is generally a process control system (PCS), a programmable logic controller (PLC) or a PC.

Structur of a Profibus PA segment

11462E02

Structur of a Foundation Fieldbus H1 segment

11463E02

3 General Safety Instructions

3.1 Safety Instructions for Assembly and Operating Personnel

The operating instructions contain basic safety instructions which are to be observed during installation, operation and maintenance. Non-observance will endanger persons, plant and the environment.

WARNING

Danger due to unauthorised work being performed on the device!

- ▷ There is a risk of injury to persons and damage to equipment.
- ▶ Assembly, installation, commissioning, operation and maintenance must only be performed by personnel who are both authorised and suitably trained for this purpose.

Before assembly/commissioning:

- ▶ Read through the operating instructions.
- ▶ Give adequate training to the assembly and operating personnel.
- ▶ Ensure that the contents of the operating instructions are fully understood by the personnel in charge.
- ▶ The national installation and assembly regulations (e.g. IEC/EN 60079-14) apply.

When operating the devices:

- ▶ Ensure the operating instructions are made available on location at all times.
- ▶ Observe safety instructions.
- ▶ Observe national safety instructions and accident prevention regulations.
- ▶ Only run the device according to its performance data.
- ▶ Servicing/maintenance or repair work which are not described in the operating instructions must not be performed without prior agreement with the manufacturer.
- ▶ Any damage may render explosion protection of the device null and void.
- ▶ No changes to the device impairing their explosion protection are permitted.
- ▶ Install and use the device only if it is undamaged, dry and clean.

If you have questions:

- ▶ Contact the manufacturer.

3.2 Warnings

Warnings are sub-divided in these operating instructions according to the following scheme:

WARNING

Type and source of the danger!

- ▷ Possible consequences.
- ▶ Measures to avoid danger.

They are always identified by the signalling word “WARNING” and sometimes also have a symbol which is specific to the danger involved.

3.3 Symbols Used

	Action request: Describes actions to be carried out by the user.
	Reaction sign: Describes the results or the reactions to the actions taken.
	Bullet
	Sentinel: Describes the notes and recommendations.
	Warning sign; danger from energised parts!
	Warning sign: Danger due to an explosive atmosphere!

4 Technical Data

Explosion protection	
Coupler mounted on DIN rail	
Gas explosion protection	
ATEX	II 2(1)G Ex mb eb ib [ia] IIC T4
IECEX	Ex mb eb ib [ia] IIC T4
Dust explosion protection	
ATEX	II (1)D [Ex ia] IIIC
IECEX	[Ex ia] IIIC
Coupler in the standard enclosure	
Gas explosion protection	
ATEX	II 2(1)G Ex mb eb ib [ia] IIC T4
IECEX	Ex mb eb ib [ia] IIC T4
Dust explosion protection	
ATEX	II 2(1)D Ex tD A21 IP 6X T80°C [ia D]
IECEX	Ex tD A21 IP 6X T80°C [ia D]
Certificates	
ATEX	BVS 06 ATEX E 004 X
IECEX	IECEX BVS 08.0057 X
Installation	in Zones 1 and 2, Zones 21 and 22 (dust), Class I, Zones 1 and 2, Class I Division 2 and in the safe area suitable enclosure necessary e.g. R. STAHL Series 8146 (plastic) or 8125, 8150 (stainless steel)
Safety data (CENELEC) per spur	FISCO (IEC 60079-27)
Max. voltage U_0	15.7 V
Max. current I_0	245 mA
Max. power P_0	960 mW
Max. connectable capacitance C_0 for IIC/IIB	476 nF / 2878 nF
Max. connectable inductance L_0 for IIC/IIB	0.58 mH / 2.9 mH
Max. internal capacitance C_i	1.1 nF
Max. internal inductance L_i	~ 0 mH
Insulation voltage U_m	253 V
Power supply	not required, the Field Device Coupler is powered from the trunk
Galvanic isolation	Test voltage according to EN 50020
Ex i spurs to Ex e trunk	1.5 kV AC
Ex i spur to Ex i spur	No galvanic isolation

Data transmission				
between trunk and spurs	passive, no repeater function			
Trunk, non-intrinsically safe / Ex e				
Connections	2 trunk connections (in, out), internally bridged			
Voltage range	16 ... 32 V			
Undervoltage monitoring	U < 16 V, spurs de-energised			
Max. current consumption		at 16 V	at 24 V	at 32 V
	0 mA per spur	28 mA	24 mA	22 mA
	20 mA per spur	120 mA	80 mA	65 mA
	40 mA per spur	220 mA	140 mA	105 mA
	3 spurs at 40 mA each, 1 spur in the short-circuit	235 mA	150 mA	105 mA
	Short-circuit all spurs	< 80 mA	< 60 mA	< 50 mA
Max. power dissipation	1.8 W			
Indication	Green LED "PWR" (U) 16 V from trunk)			
Reverse polarity protection	yes			
Max. number of Field Device Couplers	4 per trunk			
Terminating resistor	The field device couplers have a built-in, switchable terminating resistor 100 Ω + 1 μ F (IEC 61158-2). A jumper between the terminals TERM 1 and 2 connects the terminating resistance to the trunk. As an alternative, it is also possible to use an external terminating resistor series 9418.			
Spurs, intrinsically safe FISCO Ex i				
Quantity	4			
Max. cable length	120 m			
Output voltage	≥ 10 V at 40 mA per spur			
Current range	0 ... 41 mA per spur			
Min. no-load voltage	12 V			
Max. internal resistance	65 Ω			
Max. short-circuit current	50 mA			
Indication per spur	Yellow LED "S1" ... "S4"			
Earthing of cable shields (trunk and spurs)				
Direct earthing	on grounding bar			
Capacitive earthing	via 4.7 nF at terminal „S“; (grounding bolt M6)			
Power management	If the trunk voltage exceeds 16 V, the spurs are switched on one after the other to prevent a high start-up current due to the field devices. A short circuit detected on a spur will deactivate the respective spur until the short-circuit is removed. Regardless of how many spurs are short-circuited, the trunk is loaded with max one short-circuit current. This minimises the current consumption of the trunk and the power dissipation under all operating conditions.			
Fault detection				
Spur short-circuit	≥ 42 ... 50 mA			
Indication of short-circuit per spur	Yellow LED "S1" ... "S4", flashes			
Collective error message	Red LED "ERR" flashes			
Error indication on field device coupler	Red LED "ERR"			
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326 (IEC/EN 61000-4-1...6 and 11; EN 55022 class B); NAMUR NE 21 (IEC/EN 61000-4-1...6, 8 and 11; EN 55022 class B)			

Ambient conditions

Ambient temperature

Coupler mounted on DIN rails: - 40 ... + 75 °C

Coupler built in a standard enclosure: - 20 ... + 70 °C

Storage temperature

- 40 ... + 75 °C

Relative humidity
(no condensation)

< 95 %

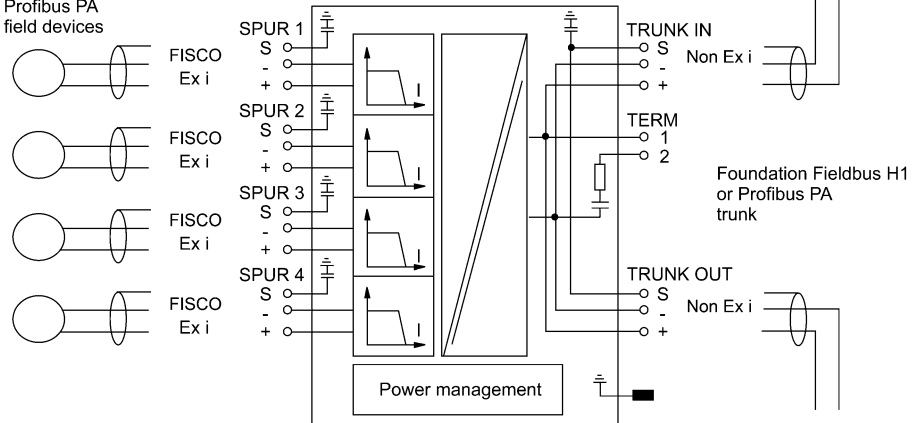
MTBF

(according to SN 29500)

109 years (at 40 °C)

Connection diagram

Foundation Fieldbus H1 or
Profibus PA
field devices



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Mechanical data

Terminals

3 pole
(+, -, screen)

screw terminals

spring cage terminals

detachable screw
terminals

trunk Ex e
spurs Ex i

trunk Ex e

spurs Ex i

only for spurs Ex i
(trunk Ex e see
"screw terminals")

rigid

0.2 ... 4 mm²

0.5 ... 2.5 mm²

0.08 ... 2.5 mm²

0.2 ... 4 mm²

flexible

0.25 ... 2.5 mm²

0.5 ... 2.5 mm²

0.08 ... 2.5 mm²

0.25 ... 2.5 mm²

flexible, end
covering sleeves

0.25 ... 2.5 mm²

0.5 ... 1.5 mm²

0.08 ... 1.5 mm²

0.25 ... 2.5 mm²

Assembly

on DIN rail, EN 50022 (NS 35/15, NS 35/7.5) or mounting plate

Installation position

vertical or horizontal

Degree of protection

Enclosure

IP30

Ex i terminals

IP20

Ex e terminals

IP30, cover closed

(enclosure may be opened in hazardous area while connected to power)

Fire protection class
(UL-94)

HB

Field Device Coupler in a
standard enclosure

Version

material

enclosure Series

Field Device Coupler

polyester

8146/.061

9411/21-211-31

9411/21-221-31

9411/21-231-31

stainless steel

8125/.061

9411/21-212-31

9411/21-222-31

9411/21-232-31

Degree of protection

IP66

Cable glands

cable glands Series 8161

4 x M20 blue (Ex i spurs)
2 x M20 black (Ex e trunk)
1 x M16 black (earth)

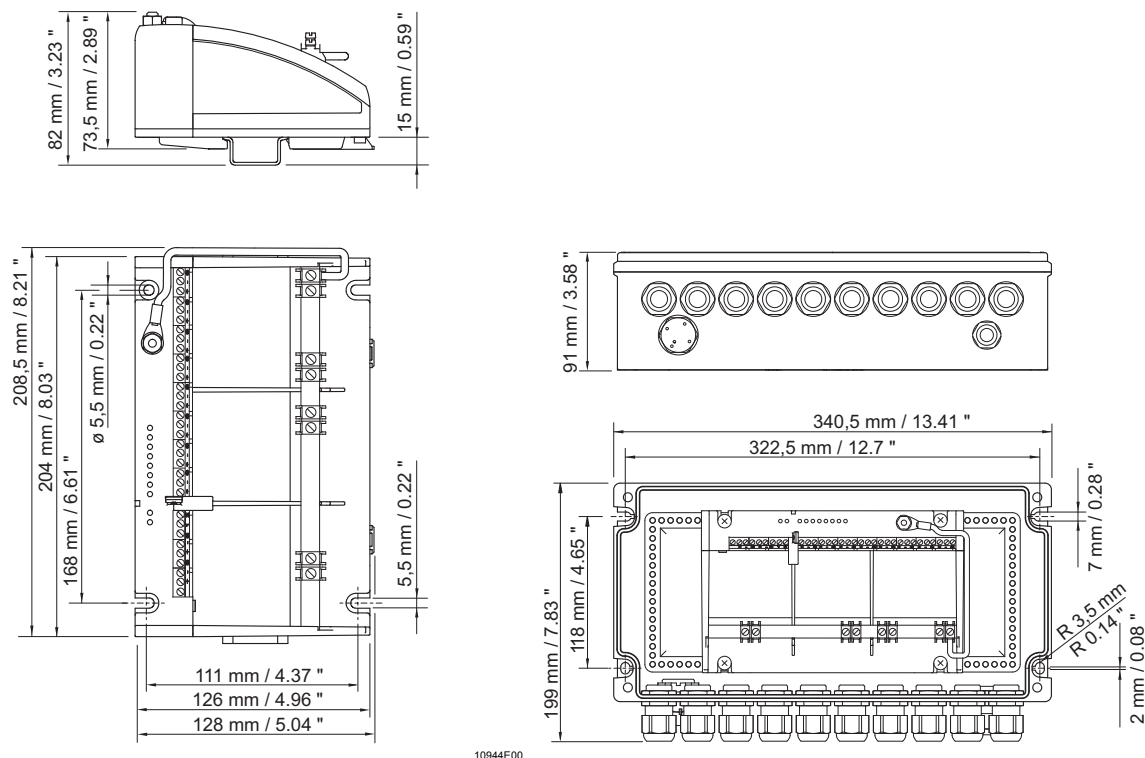
breathing gland Series 8162

1 x M25



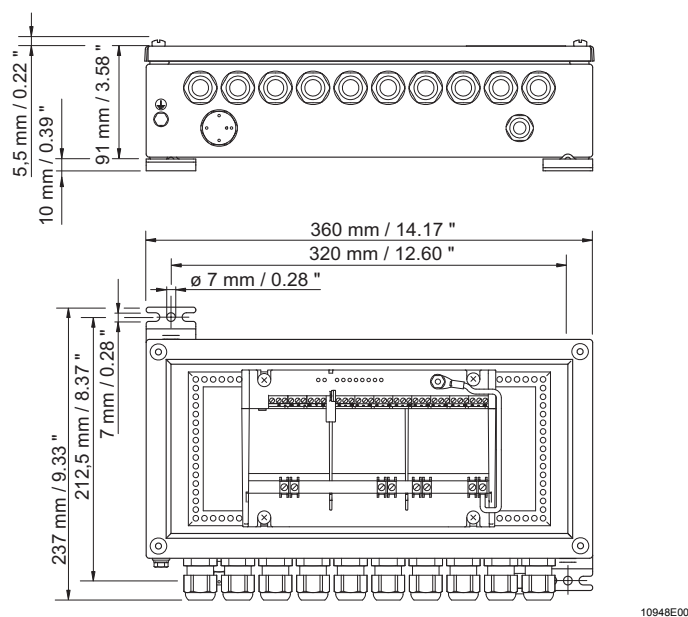
Additional technical data for layout and designs: see the data sheet

Dimensional Drawings (All Dimensions in mm / inches) - Subject to Alterations



9411/21-2.0-41
Field Device Coupler without enclosure

9411/21-2.1-41
Enclosure 8146/.S71 incl. Field Device Coupler



9411/21-2.2-41
Enclosure 8125/.071 incl. Field Device Coupler

5 Designated Use

WARNING

Use the device for its intended purpose only!

- ▷ Otherwise, the manufacturer's liability and warranty expire.
- ▶ Only use the device under the operating conditions described in the operating instructions.
- ▶ The device must be used in areas subject to explosion hazards only according to these operating instructions.

The series 9411/21 field device coupler is suitable for use in Zone 1, 2, 21 and 22 hazardous areas.

It is used for connecting up to four intrinsically safe field devices to a non-intrinsically safe trunk. In so doing, the trunk and spurs are galvanically isolated.

Intended use

- ✗ For all fieldbuses with a IEC 61158-2 physical layer, e.g. Foundation Fieldbus H1 and Profibus PA.
- ✗ For non-intrinsically safe trunks, Ex e connections.
- ✗ For intrinsically safe spurs (Ex i and FISCO), to connect intrinsically safe field devices.

Overview of explosion protection for field device coupler, trunk and spurs

Field device coupler EX e / Ex i	Zone 0	Zone 1	Zone 2	Zone 21	Zone 22	non-hazardous area
9411/21-211-31, 9411/21-220-31, 9411/21-230-31 with enclosure	not permitted	Ex e enclosure required	Enclosure as per IEC/EN 60079-14 required	Enclosure as per IEC/EN 61241-1 required	Enclosure as per IEC/EN 61241-1 required	o.k.
9411/21-211-31, 9411/21-221-31, 9411/21-231-31 with polyester enclosure 8146/.61	not permitted	o.k.	o.k.	o.k.	o.k.	o.k.
9411/21-212-31, 9411/21-222-31, 9411/21-232-31 with stainless steel enclosure 8125/.61						
Trunk	not permitted	Ex i	Ex nA	o.k.	o.k.	o.k.
Spurs	Ex ia	Ex ia	Ex nL	o.k.	o.k.	o.k.



The R. STAHL enclosure series 8146 (polyester), 8125 (sheet steel or stainless steel), 8126 (stainless steel) meet the requirements.

WARNING

When mounting in an EX e enclosure:

- ▶ Affix an indication label (in accordance with IEC/EN 60079-7):
“Non-intrinsically safe circuits protected by internal IP30 cover“

6 Functional Description

The field device coupler is used for connecting up to four intrinsically safe field devices to a non-intrinsically safe trunk. In so doing, the trunk and spurs are galvanically isolated.

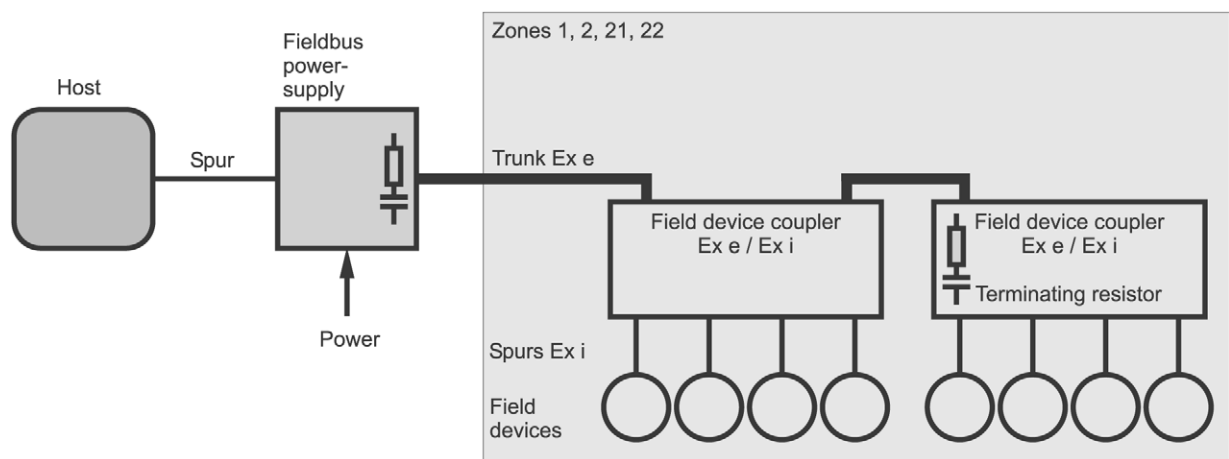
The field device coupler functions at the physical level only, e.g., it functions independently of the protocol used. It can therefore be used for every fieldbus that is compliant with IEC 61158-2. At this time, these include the Foundation Fieldbus H1 and the Profibus PA.

Each field device can be supplied with a maximum of 40 mA current. As short circuit protection, each spur features a 50 mA current limiting function.

A termination resistor is built-in and can be activated/deactivated via a jumper.

Cable shield can either be capacitively or directly earthed.

The trunk voltage connecting to the field device coupler is monitored for undervoltage (< 16 V) and indicated by a LED. Other LEDs indicate the status of the spurs.



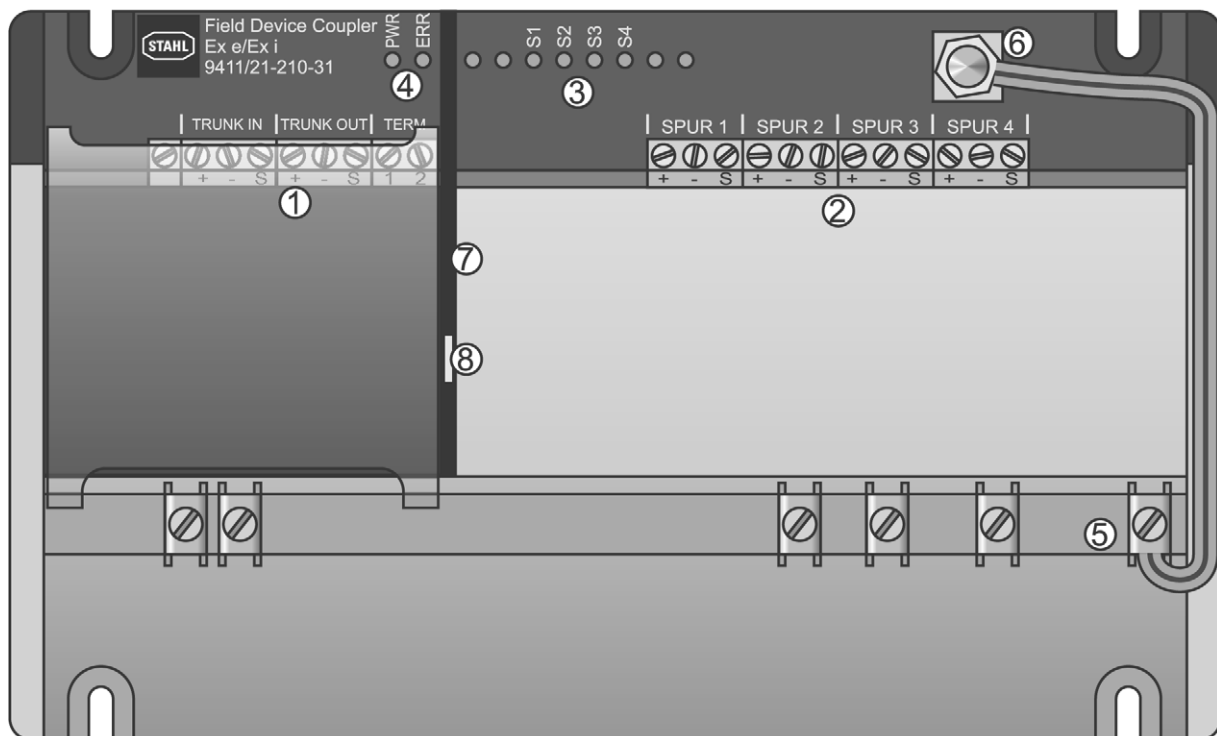
11458E02

Power management

As soon as the voltage of 16 V on the trunk is exceeded, the spurs are activated one after the other to prevent a high start-up current by the field devices. In the event of a short-circuit, the spur in question is deactivated until the short-circuit is eliminated.

If several spurs are affected by a short-circuit, the trunk is loaded only with maximum one short-circuit current. This minimises the current consumption of the trunk and the power loss of the coupler under all operating conditions.

7 Device design



11455E00

- | | |
|---|---|
| 1 | Ex e area;
The Ex e connection terminals for the trunk and the jumper for activating the terminating resistor are protected by a hinged cover (IP 30). |
| 2 | Ex i area;
Ex i connection terminals for spur 1 ... spur 4 |
| 3 | Operation indicating LEDs for spur 1 ... spur 4 |
| 4 | Operation indicating LEDs for PWR (power) and ERR (error) |
| 5 | Cable screen bus bar for cable shields with slidable terminals |
| 6 | Ground bolt for earthing |
| 7 | Partition plate; guarantees prescribed spacing of lead wires between Ex e and Ex i connection terminals |
| 8 | Park position for jumper |

8 Transport, Storage and Disposal

Transport

- Shock-free in its original carton, do not drop, handle carefully.

Storage

- Store in a dry place in its original packaging.
- Permitted temperature range for storage in original packaging: - 40 °C ... + 75 °C.

Disposal

- Ensure environmentally friendly disposal of all components according to the legal regulations.

9 Assembly

⚠ WARNING	
	Incorrectly installed components!
	► Explosion protection cannot be guaranteed any more if the components are incorrectly installed. ► Carry out the assembly in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).
	Do not select a mounting location that necessitates the cable lengths that exceed the maximal permissible values (see chapter 10.3, Cable lengths).

9.1 Mounting with enclosure

	Relevant to field device couplers 9411/21-211-31, 9411/21-221-31 respectively 9411/21-231-31 in polyester enclosure 8146/.61 and 9411/21-211-31, 9411/21-221-31 respectively 9411/21-231-31 in stainless steel enclosure 8146/.71
► Installation with screws (hole spacing: see chapter 4, Technical data)	

9.2 Mounting without enclosure

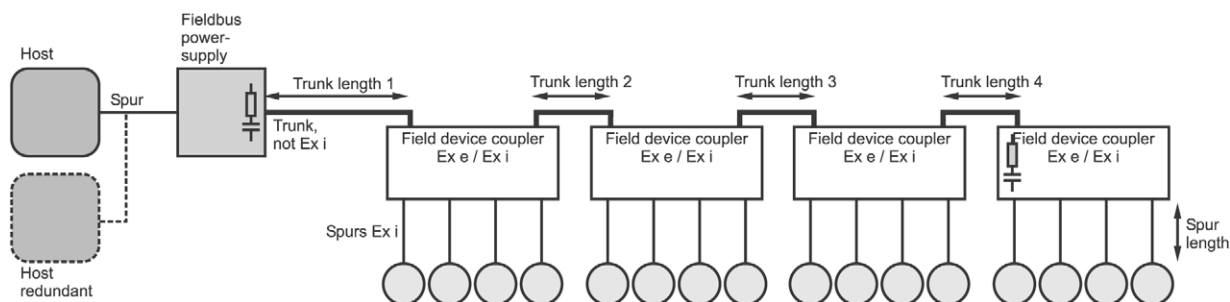
	Relevant to field device couplers 9411/21-210-31, 9411/21-220-31 respectively 9411/21-230-31
	Field device couplers without enclosures are always delivered ready for DIN rail mounting.

- ✗ For installation in non-hazardous areas, e.g. in normal switch cabinet or open rack.
- ✗ For installation in an enclosure not mentioned above.

10 Installation

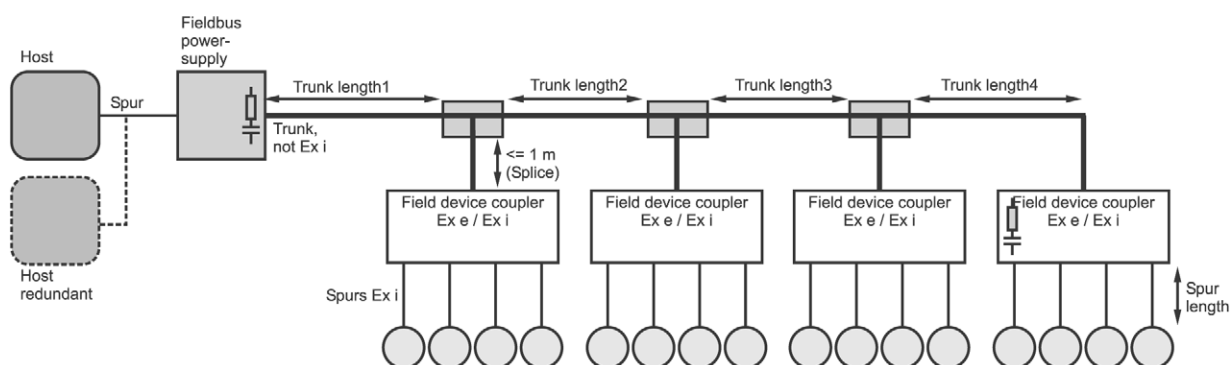
⚠ WARNING	
	Incorrectly installed components! ▶ Explosion protection cannot be guaranteed any more if the components are installed incorrectly. ▶ Carry out the installation in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).

10.1 Examples of fieldbus segment topologies



11460E02

Fieldbus segment with „daisy chain structure“. The trunk is looped through the field device couplers.



11461E02

Fieldbus segment in which the field device couplers are connected to the trunk with junction boxes (T-connectors).



- X the field device is certified in accordance with FISCO.
- X the conditions regarding cable values as per IEC 60079-27 are adhered to:
 - R_C 15 ... 150 Ohm/km
 - L_C 0,4 ... 1mH/km
 - C_C 45 ... 200nF/km

Spur of field device coupler		Field device
U_0	$\leq$	U_i
I_0	$\leq$	I_i
P_0	$\leq$	P_i
C_0	$\geq$	$C_i + C_{\text{Cable}}$
L_0	$\geq$	$L_i + L_{\text{Cable}}$

10.3 Cable lengths for trunk and spurs in accordance with IEC 61158-2, Annex B (without considering the explosion protection)

	The maximum length for all cables (all trunks, all spurs) per segment must not exceed 1900 m.				
	Number of all field devices on the segment, including host(s)				
	1 ... 12	13 ... 14	15 ... 18	19 ... 24	25 ... 30
Max. cable length for spurs, 1 field device per spur	120 m	90 m	60 m	30 m	1 m
Max. cable length for spurs, 2 field devices per spur (e.g. for redundant hosts)	90 m	60 m	30 m	1 m	1 m
	The actual trunk and spur lengths can be shorter due to voltage drop.				
	The maximum length of an Ex i spur according to IEC 60079-27 (FISCO) is 30 / 60 m. From the viewpoint of the FISCO model, the Ex i spurs of a field device coupler are to be considered as a new segment (whereby the maximum segment length = trunk + spurs = 1000 m). The table above can be used for this purpose.				
	The following generally applies: Spurs should be kept as short as possible. Maximum spur length = 120 m				

10.4 Examples of cable lengths

Cable lengths for trunk with 12 field devices with a current consumption of 15 mA:

Assumption:

- ✗ Fieldbus power supply with $U_{out} > 25 \text{ V}$ / $I_{out} > 350 \text{ mA}$.
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance: 48 ohms/1000 m) are used.
- ✗ Three field device couplers lie at the end of the trunk.
- ▷ Maximum trunk length: approx. 600 m.

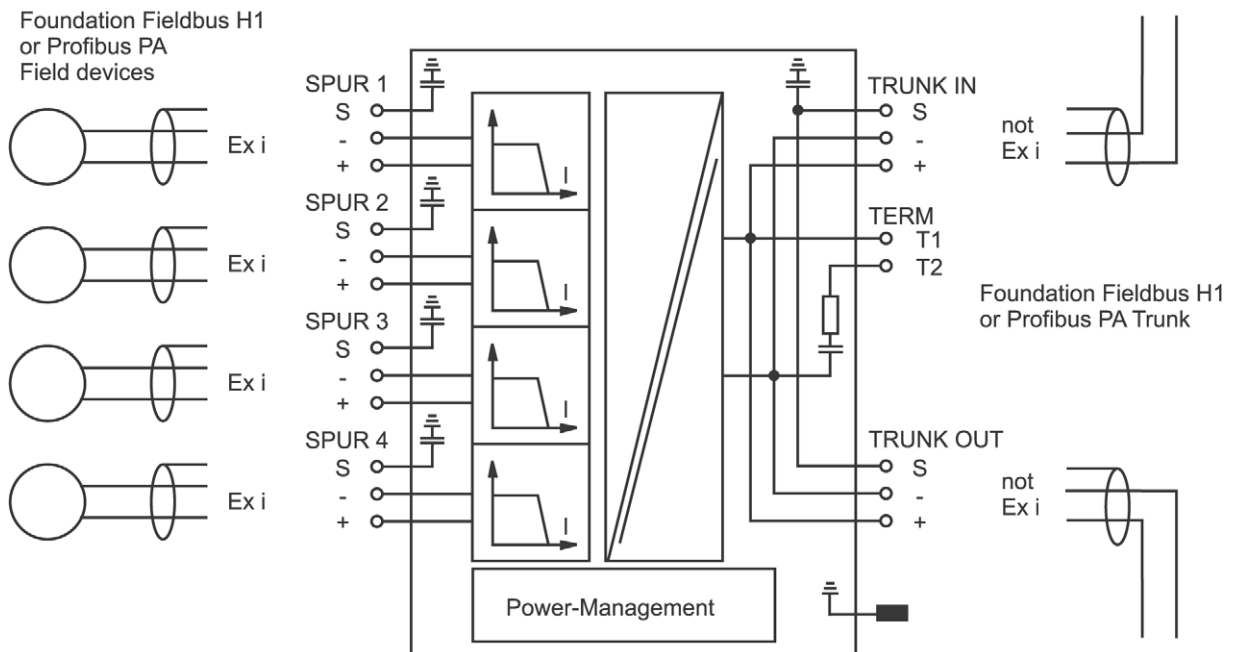
Cable length for trunk with 16 field devices with a current consumption of 15 mA per device:

Assumption:

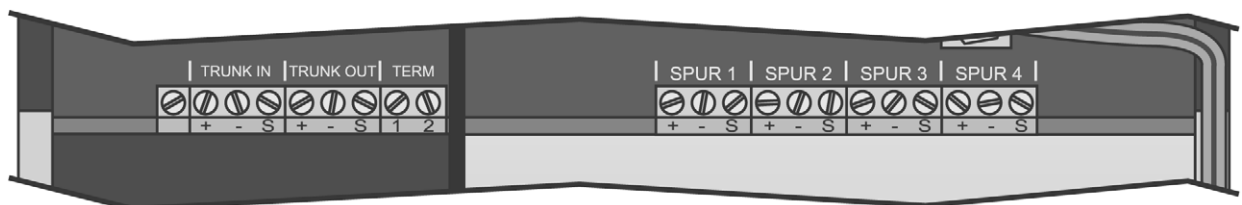
- ✗ Fieldbus power supply with $U_{out} > 25 \text{ V}$ / $I_{out} > 350 \text{ mA}$.
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance: 48 ohms/1000 m) are used.
- ✗ Four field device couplers lie at the end of the trunk.
- ▷ Maximum trunk length: approx. 380 m

10.5 Connection

 WARNING	
	Laying of intrinsically safe and non-intrinsically safe cabling together: ▷ Explosion protection is not guaranteed any longer. ▶ Always lay intrinsically safe and non-intrinsically safe cables in separate paths.



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Trunk

 WARNING	
	Open cover on the non-intrinsically safe trunk: ▷ Explosion protection is not guaranteed any longer. ▶ The fieldbus must be deactivated before opening the cover. ▶ Secure the fieldbus against unauthorised activation.
	TRUNK IN and TRUNK OUT (+,-,S) are connected through internally in the field device coupler.

- ▶ Disconnect the fieldbus from the power supply.
- ▶ Open enclosure/cover.
- ▶ Insert leads in the corresponding terminals:
TRUNK IN: Lead from host or fieldbus power supply.
TRUNK OUT: If applicable, lead to the next field device coupler.
- ▶ Close/screw tight the terminals.
- ▶ Close cover/enclosure.

Spur

	Intrinsically safe spur connections can be worked on while connected to power.
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	Only one field device can be connected per spur connection.
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- ▶ Open enclosure.
- ▶ Insert leads in the corresponding terminals.
- ▶ Close/screw tight the terminals.
- ▶ Close enclosure.

10.6 Earthing

Field device coupler without enclosure

	The field device coupler is not required to be connected to earth because the intrinsically safe and non-intrinsically safe circuits are galvanically isolated from each other.
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If the cable shields are to be capacitively earthed (by connecting to the “S” marked terminals):

- ▶ Connect the earthing bolt to the cable screen bus bar (delivery condition from factory).
- ▶ Connect the cable screen bus bar to earth.

Field device coupler with metal enclosure

- ▶ Connect the enclosure to earth via the shortest possible route.

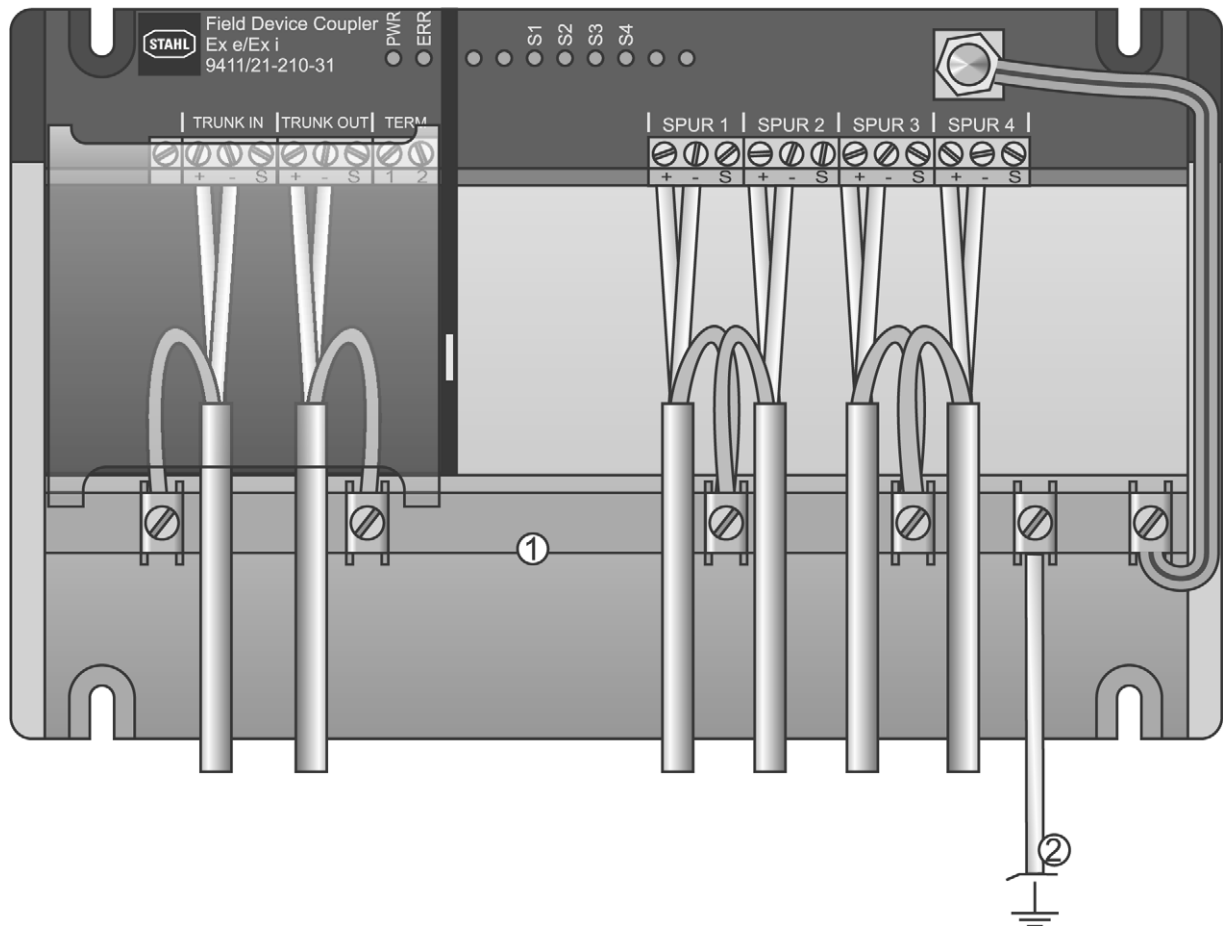
10.7 Earthing of cable shields

There are many, and sometimes inconsistent, regulations regarding earthing of cable shielding:

- ✗ IEC / EN 60079-14, section 12.2.2.3
- ✗ Profibus Technical Guideline „Profibus PA“ User and Installation Guideline, section 3.3.3
- ✗ Fieldbus Foundation „System Engineering Guidelines“ AG 181, section 6.2f

If high-quality potential equalisation exists within the plant:

	This shielding concept is recommended by R. STAHL. The direct earthing the cable shielding at both cable ends is the best solution in view of electromagnetic compatibility. The prerequisite for this is high-quality potential equalisation.
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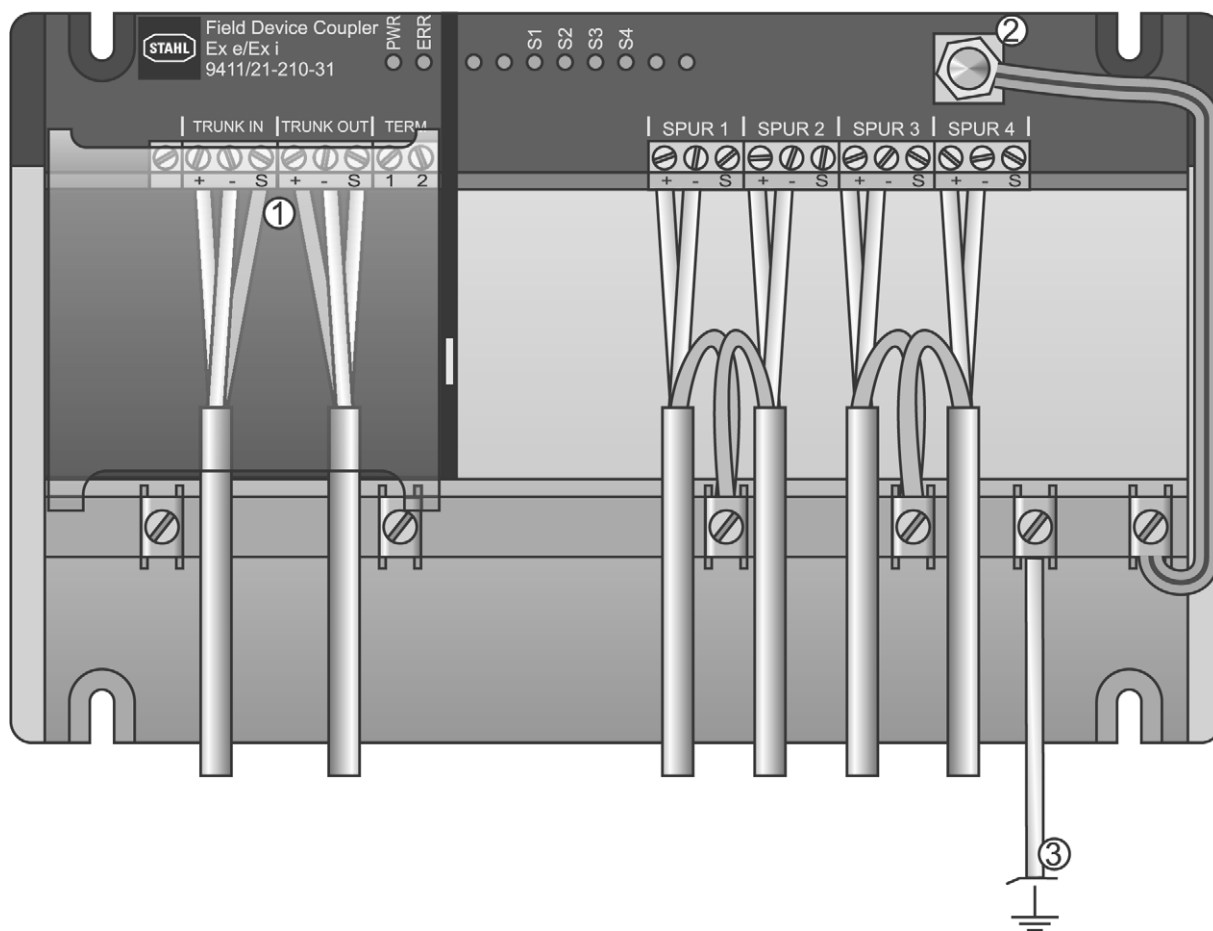
- Lay all cable shields of the trunk and spurs on the cable screen bus bar (1).
- Connect the cable screen bus bar to earth via the shortest possible route (2).



When installing directly (with screws) in metal enclosure 8125, the earthing bolt is electrically connected via mounting to the enclosure.

- Directly earth the cable shield of the trunk at the host/fieldbus power supply side (as a rule, at the fieldbus power supply).
- Directly earth the cable shields of the spurs at the field devices.

If no high-quality potential equalisation exists within the plant:



11456E00

- ▶ Connect the cable shields of the trunk to the “TRUNK IN S” terminals and, if needed, to the “TRUNK OUT S” (1).
- ▶ Connect the earthing bolt (2) with the cable screen bus bar so that good conductance is achieved (delivery condition from factory).
- ▶ Connect the cable screen bus bar to earth via the shortest possible route (3).
- ▷ In this way, the cable shield of the trunk is capacitively earthed.

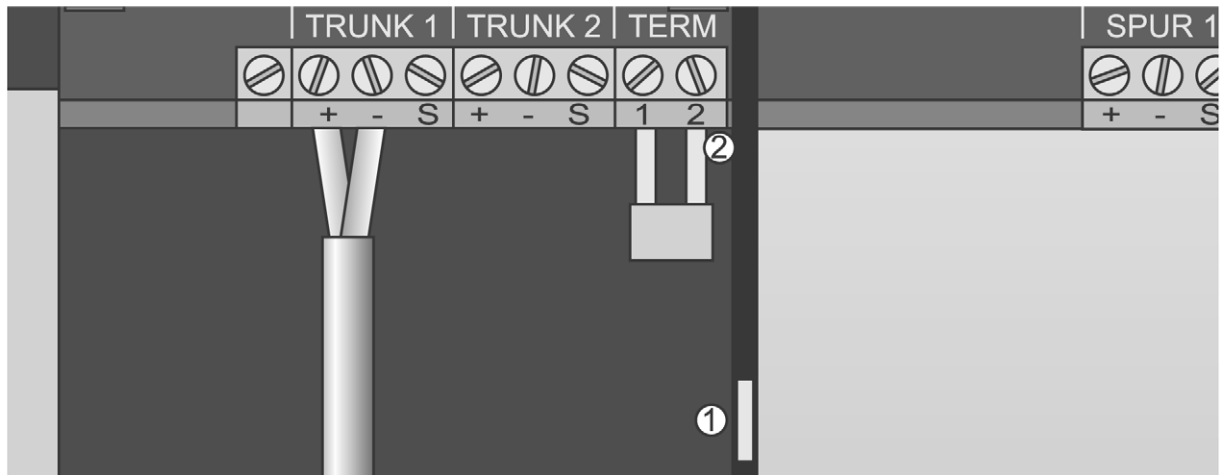
	When installing directly (with screws) in metal enclosure 8125, the earthing bolt is electrically connected via mounting to the enclosure.
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- ▶ Lay the cable shields of the spurs on the cable screen bus bar.
- ▶ Directly earth the cable shield of the trunk at the host/fieldbus power supply side (as a rule, at the fieldbus power supply).
- ▶ Insulate the cable shields of the spurs connecting at the field devices. Do not earth them.

10.8 Terminating resistor (terminator)

	A terminating resistor is required at both ends of the trunk. Spurs are operated without terminating resistors.
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Field device coupler is located at the end of the trunk

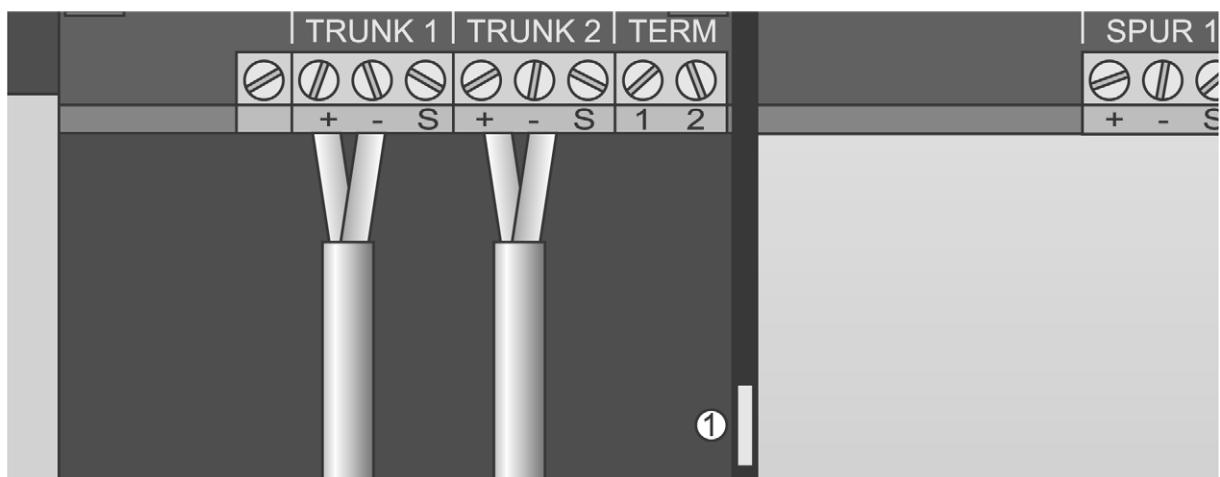


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	The terminals on the „TRUNK OUT“ terminal block are not to be used.
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- ▶ Remove the factory-provided jumper from the park position (1).
- ▶ Insert the jumper in terminals „1“ and „2“ on the „TERM“ terminal block (2).
- ▶ Close/screw tight the terminals.
- ▷ The built-in terminating resistor is activated.

Field device coupler is not located at the end of the trunk



11454E00

	The terminals on the „TERM“ terminal block are not to be used.
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- ▶ Insert the factory-provided jumper in the park position (1).
- ▷ The built-in terminating resistor is not activated.

11 Putting into Service

Before commissioning

- ▶ Test the components for correct operation and installation in accordance with the operating instructions and other applicable specifications.
- ▶ Check that cables and lines are clamped properly.
- ▶ Inspect housing for damage.
- ▶ Inspect housing for foreign bodies.
- ▶ Check whether all unused cableglands and holes are sealed off properly.
- ▶ The voltage on the trunk must be at least 16 V DC.
- ▶ The voltage to the connected field devices must be at least 9 V DC.

Commissioning

- ▶ Observe the national regulations when commissioning.
- ▶ Follow the Directives in accordance with EN 60079-17 when conducting function inspections.

LED indicators, functional description



11451E00

PWR, green	ERR, red	S (1 ... 4), yellow	Description
OFF			No voltage on the trunk
ON			Voltage on trunk o.k. $U \geq 16 \text{ V}$
	OFF	OFF	Open-circuit on the corresponding spur Spur not connected $I \leq 1 \text{ mA}$
	OFF	ON	Corresponding spur connected to field device, $3 \text{ mA} \leq I \leq 50 \text{ mA}$
	blinking	blinking	Short-circuit on the corresponding spur $40 \text{ mA} \leq I \leq 50 \text{ mA}$
	ON		Internal device fault

12 Maintenance

⚠ WARNING	
	Danger from energised parts! ▷ Explosion protection is not guaranteed any longer. ▶ Switch off the power to the fieldbus before opening the enclosure cover. ▶ Secure the fieldbus against unauthorised activation.
	 The enclosure may be opened while connected to power. Intrinsically safe spurs can be worked on while connected to power.

12.1 Regular Maintenance Work

- ▶ Consult the relevant national regulations (e.g. IEC/EN 60079-17) to determine the type and extent of inspections.
- ▶ Plan the intervals so that any defects in the equipment which may be anticipated are promptly detected.

To check as part of the maintenance schedule:

- ✗ Check that cables and lines are clamped properly.
- ✗ Tightness of the cable glands.
- ✗ Inspect the enclosure for visual damage.
- ✗ Check the seal between enclosure and cover.
- ✗ Check the enclosure for moisture
- ✗ Check the compliance with the permitted temperatures.
- ✗ Make sure that the device is used according to its designated use.

12.2 Repair work

⚠ WARNING	
	Danger due to improper maintenance/repairs ▷ Explosion protection is not guaranteed any longer. ▶ Repair work to the device must only be performed by R. STAHL.

12.3 Cleaning

- ✗ Clean with a cloth, brush, vacuum cleaner or similar items.
- ✗ When cleaning with a damp cloth use water or mild, non-abrasive, non-scratching cleaning agents.
- ✗ Never use aggressive cleaning agents or solvents.

13 EC-Declaration Of Conformity

EG-Konformitätserklärung EC-Declaration of Conformity Déclaration de Conformité CE



Wir; we; nous

R. STAHL Schaltgeräte GmbH, Am Bahnhof 30, 74638 Waldenburg, Germany

9411/21-2de-f1

9411/24-3de-f1

d = 1, 2 e = 0, 1, 2 f = 3, 4

erklären in alleiniger Verantwortung, dass das Produkt
hereby declare in our sole responsibility, that the product
déclarons, sous notre seule responsabilité, que le produit

Feldgerätekoppler
Field device coupler
Coupleur d'appareil de terrain

mit der EG-Baumusterprüfbescheinigung:
under EC-Type Examination Certificate:
avec Attestation d'examen CE de type:

BVS 06 ATEX E 004 X
(DEKRA EXAM GmbH
Dinnendahlstraße 9, 44809 Bochum)

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt
which is the subject of this declaration, is in conformity with the following standards or normative documents
auquel cette déclaration se rapporte, est conforme aux normes ou aux documents normatifs suivants

Bestimmungen der Richtlinie Terms of the directive Prescription de la directive	Nummer sowie Ausgabedatum der Norm Number and date of issue of the standard Numéro ainsi que date d'émission de la norme
94/9/EG: ATEX-Richtlinie 94/9/EC: ATEX Directive 94/9/CE: Directive ATEX	EN 60079-0: 2009 EN 60079-7: 2007 EN 60079-11: 2007 EN 60079-15: 2005 EN 60079-18: 2004 EN 60079-26: 2007 EN 60079-27: 2008 EN 61241-0: 2006 EN 61241-1: 2004 EN 61241-11: 2006
2004/108/EG: EMV-Richtlinie 2004/108/EC: EMC Directive 2004/108/CE: Directive CEM	EN 61326-1: 2006
Allgemeine Normen ohne Bezug auf eine Richtlinie General standards without reference to a directive Normes générales sans référence à une directive	EN 50178: 1997 EN 61010-1: 2001 + Corrigendum / Errata

Waldenburg, 16.07.2010

Ort und Datum
Place and date
Lieu et date

J.-P. Rückgauer
Leiter Entwicklung und Technik
Director Design and Technology
Directeur Développement et Technique

Dr. S. Jung
Leiter Qualitätsmanagement
Director Quality Management Dept.
Directeur Dép. Assurance de Qualité

F-4174-601 11/2009 STMZ

9411 6 002 002 0_00



14 Certification Drawing

The Type 9411/21-2**-*1 Field Device Coupler is an Explosion-protected device for installation in Class I, Zone 1 or Class I, II, III, Div.2, Groups A-G hazardous (Classified) areas and provides intrinsically safe connections for four or eight field devices located in Class I, II, III, Division 1, Group A-G or Class I, Zone 0, [AEx ia] Group IIC/IIB hazardous locations according to NEC Article 504/505 as listed below.

Field device coupler Type 9411/21-2ab-c1

a = numeral 1 or 2 for design of terminal	1 = Screw type terminals; 2 = Cage clamp terminals
b = numeral 0, 3 or 4 for Protective Enclosure	0 = without; 3 = Plastic (Type 8146); 4 = Metal (Type 8125)
c = numeral 3 or 4 for number of Channels	3 = 4 Channels; 4 = 8 Channels

Entity parameters for wiring configurations are as follows:

Terminals SPUR 1 to 4 (8): + / -	V _{OC} [V]	I _{SC} [mA]	P _O [mW]	L _O CL.I, Div.1, A,B / Zone 0, GP. IIC	L _O CL.I, Div.1, C-G / Zone 0, GP. IIB	C _O CL.I, Div.1,A,B / Zone 0, GP. IIC	C _O CL.I, Div.1, C-G / Zone 0, GP. IIB	L _O /R _O CL.I, Div.1,A,B / Zone 0, GP. IIC	L _O /R _O CL.I, Div.1, C-G / Zone 0, GP. IIB
	15,7	245	960	0,58 mH	2,9 mH	476 nF	2878 nF		

Notes:

1. For Connections refer to chapter 10 of Operation instruction ID-Nr. 9411 6 031 001 0.
2. Intrinsically safe apparatus may be one of the following: switches, thermocouples, LEDs, RTDs, or Entity device connected in accordance with the manufacturer's installation instructions.
3. For Entity concept use the appropriate parameters to ensure the following:

$V_t \text{ or } V_{OC} \leq V_{max}$	$C_o, C_a \geq C_i + C_{cable}$	$P_o \leq P_i$
$I_t \text{ or } I_{SC} \leq I_{max}$	$L_o, L_a \geq L_i + L_{cable}$	
4. Electrical apparatus connected to the non-intrinsically safe Connections (Trunk IN, Trunk Out, and Term) shall not use or generate voltages > 250 V (U_{max}).
5. Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP 12.06.01
6. Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
7. Each channel shall be installed within a separately shielded cable or a single cable with a separate shield for each channel.
8. Alternatively use Terminal "S" for connection of the cable shield for capacitive ($\leq 5,2 \text{ nF}$) decoupled grounding or use ground busbar terminals for direct ground connection.
9. Ambient temperature:

-40°C ... +75°C (Type 9411/21-2a0-c1)
-20°C ... +70°C (Type 9411/21-2ab-c1, b = 3, 4)
10. The following only applies for Type 9411/21-2a0-c1
 - Use a general purpose enclosure meeting the requirements of ANSI/ISA S82.02.01 for use in non-hazardous or Class I, Division 2, hazardous (classified) locations.
 - Use an FM Approved Dust-ignition proof enclosure appropriate for environmental protection in Class II, Division 1, Groups E, F and G; and Class III, hazardous (classified) locations.
 - The FDC Type 9411/21-2a0-c1 are to be snap mounted on DIN rail or screw mounted on a rail or plate.

			Certification drawing				
			2006	Date	Name	Title	Scale
			Drawn	24.05.	Einsiedler	IS bus - Field Device Coupler Type 9411/21-2**_*1	none
			Appr.		Kaiser		Sheet
							1 of 1
						Drawing No.	Agency
01	19.09.06	Einsiedler				9411 6 031 001 1	FM
Index	Date	Drawn				Replaces:	Replaced by: